

Technical Update

for Municipal Drinking Water Systems

Drinking Water Testing for Microbiological Parameters

The Safe Drinking Water Act, 2002 requires that owners and operating authorities of regulated drinking water systems ensure that the water provided by the system meets the prescribed drinking water quality standards.

To this end, the Drinking-Water Systems Regulation (O. Reg. 170/03) prescribes the testing of drinking water grab samples for microbiological parameters. The frequency of testing depends on the category of the drinking water system. The eight categories of drinking water systems are defined in the Regulation. In-line microbiological testing equipment is permitted to meet sampling and analysis requirements, upon prior approval of the Director, Ministry of the Environment.

O. Reg. 170/03 requires a drinking water testing service to be accredited for the methods used to conduct the tests for microbiological parameters on drinking water samples. As of October 1, 2003, laboratories must obtain a drinking water testing licence issued by the Ministry of the Environment which authorizes the conduct of the tests. The microbiological test performed must be specified in the licence, or the licence must expressly authorize the conduct of the test.

When tests for more than one microbiological parameter are required on a sample of drinking water, the laboratory must conduct separate tests

for each parameter; and must not infer the result for one parameter from a result obtained for another parameter.

Requirements for taking microbiological samples

If a treated or a distribution sample is taken for microbiological testing under O. Reg. 170/03, or as a requirement of an approval or order, the owner and operating authority of the water system shall ensure that a sample is taken concurrently at the same location for the immediate measurement of:

- 1) free chlorine residual if the system provides chlorination, and does not provide chloramination; and
- 2) combined chlorine residual if the system provides chloramination.

For each category of drinking water system, O. Reg. 170/03 prescribes the type of sample (i.e. raw water, treated, or distribution samples) that must be collected. Distribution samples and raw water samples must be collected for all categories of systems. For large municipal residential systems, treated samples must also be taken from the point at which water enters the distribution system.

Water samples must be tested for total coliforms and for *E. coli* or fecal coliforms. Testing is also required for general bacteria population expressed as colony counts on a heterotrophic plate count (HPC).

Large municipal residential systems, however, have the option of testing for general bacteria population expressed as either background colony counts on the total coliform membrane filter, or as colony counts on a heterotrophic plate count.

Collection and handling considerations

The laboratory conducting the test is required to provide information to the drinking water system owner/operating authority regarding sample collection and handling. The owner/operating authority is required to follow that direction. If the laboratory does not have specific written instructions, it can provide the owner/operating authority with the Ministry of the Environment document, *Practices for the Collection and Handling of Drinking Water Samples* (June 2003).

Aerators, hose attachments, filters and strainers may harbour bacteria and should be removed from taps prior to sampling for microbiological parameters. Lines should be flushed for at least 2 to 5 minutes or to minimize the effects of local plumbing. (A dedicated tap or spigot for regulatory sampling purposes is recommended).

Sample collection and handling practices are crucial to obtaining valid data. Aseptic techniques must be followed when handling the sterile sample bottles used for microbiological sample collection. Failure to do so will compromise results. As it is especially important that the sterile bottles remain closed until the time of sampling, it is recommended that sample bottles for microbiological testing have caps with tamper-proof seals. If the seal is broken the bottle should be discarded. The sampling bottles may have a sodium thiosulphate preservative, and it is important not to rinse these bottles before sampling. The sodium thiosulphate prevents further chlorine disinfection by stabilizing the sample in the condition in which it was collected.

Storage and transportation requirements

Samples must be transported to the laboratory in accordance with directions provided by the laboratory. A cooler or foam pack container containing ice or ice packs is recommended. The use of loose ice is not recommended as it may contaminate the sample. If ice packs are not available, the ice should be encased in waterproof packaging or a sealed container. It is also important to ensure that samples for microbiological testing do not freeze during shipment. Some courier companies offer shipping in heated vehicles during winter months. Samples for microbiological analysis are perishable and must be analyzed within the holding time specified by the laboratory. A chain-of-custody form must accompany samples to the laboratory.

Finding a licensed lab

The Ministry of the Environment maintains a list of licensed labs with contact names. This list can be found on its Web site at:

www.ene.gov.on.ca/envision/water/sdwa/lablicensing.htm

For more information contact:

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